



MSP430-PIR development board

Users Manual



All boards produced by Olimex are ROHS compliant

Revision C, April 2011

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INTRODUCTION:

MSP430-PIR is pir sensor with MSP430F2013 microcontroller.

BOARD FEATURES:

- MSP430F2013 microcontroller
- low power PIR sensor
- status LEDs
- CR2032 battery holder
- JTAG connector
- supports both Olimex and TI SBW layout
- Dimensions: 42.27x25.89 mm (1.66x1.03")

ELECTROSTATIC WARNING:

The **MSP430-PIR** board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

BOARD USE REQUIREMENTS:

Cables: The cable you will need depends on the programmer/debugger you use. If you use MSP430-JTAG-TINY-V2, you will need USB A-B cable, and if you use MSP430-JTAG, you will need LPT cable.

Hardware: Programmer MSP430-JTAG-TINY-V2, [MSP430-JTAG](#), or other compatible programming/debugging tool

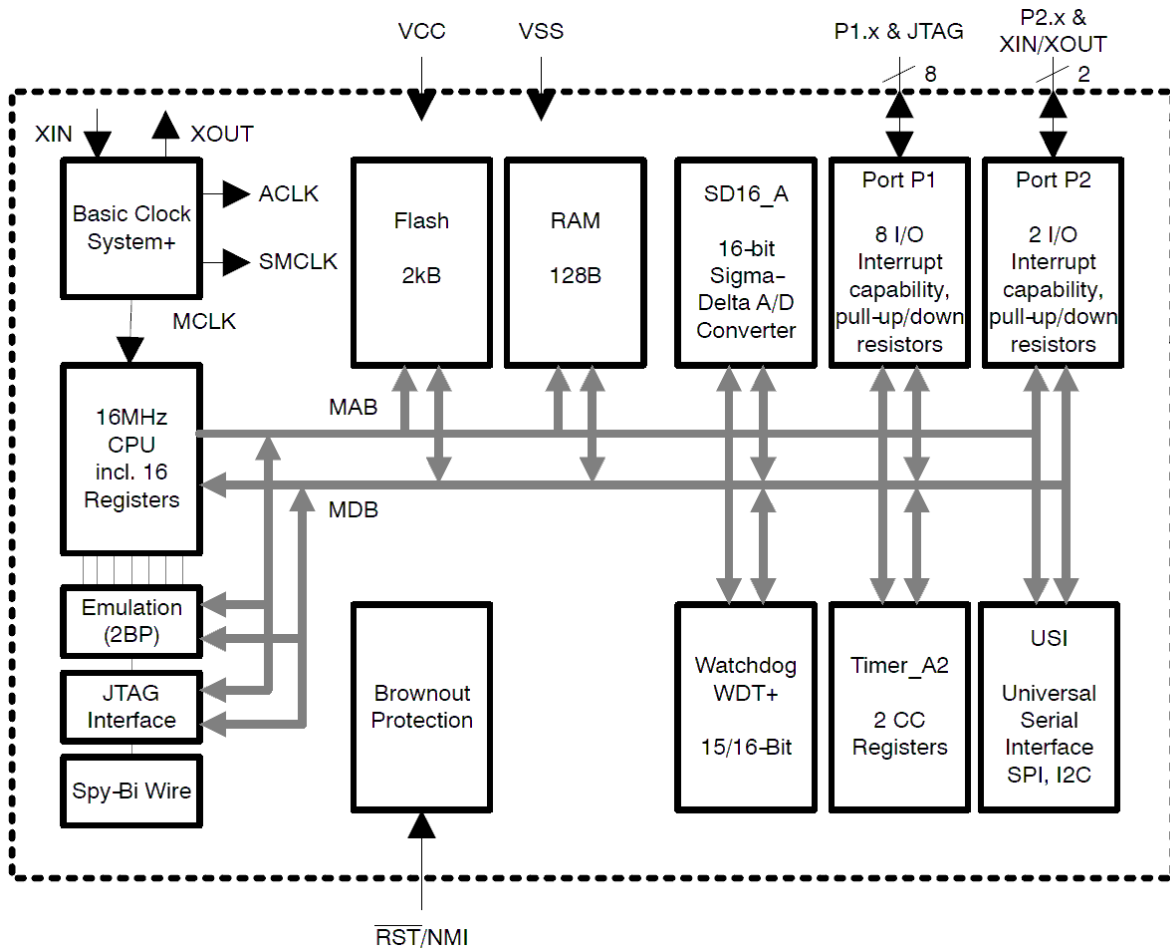
PROCESSOR FEATURES:

MSP430-PIR board use ultralow-power microcontroller **MSP430F2013** from Texas Instruments with these features:

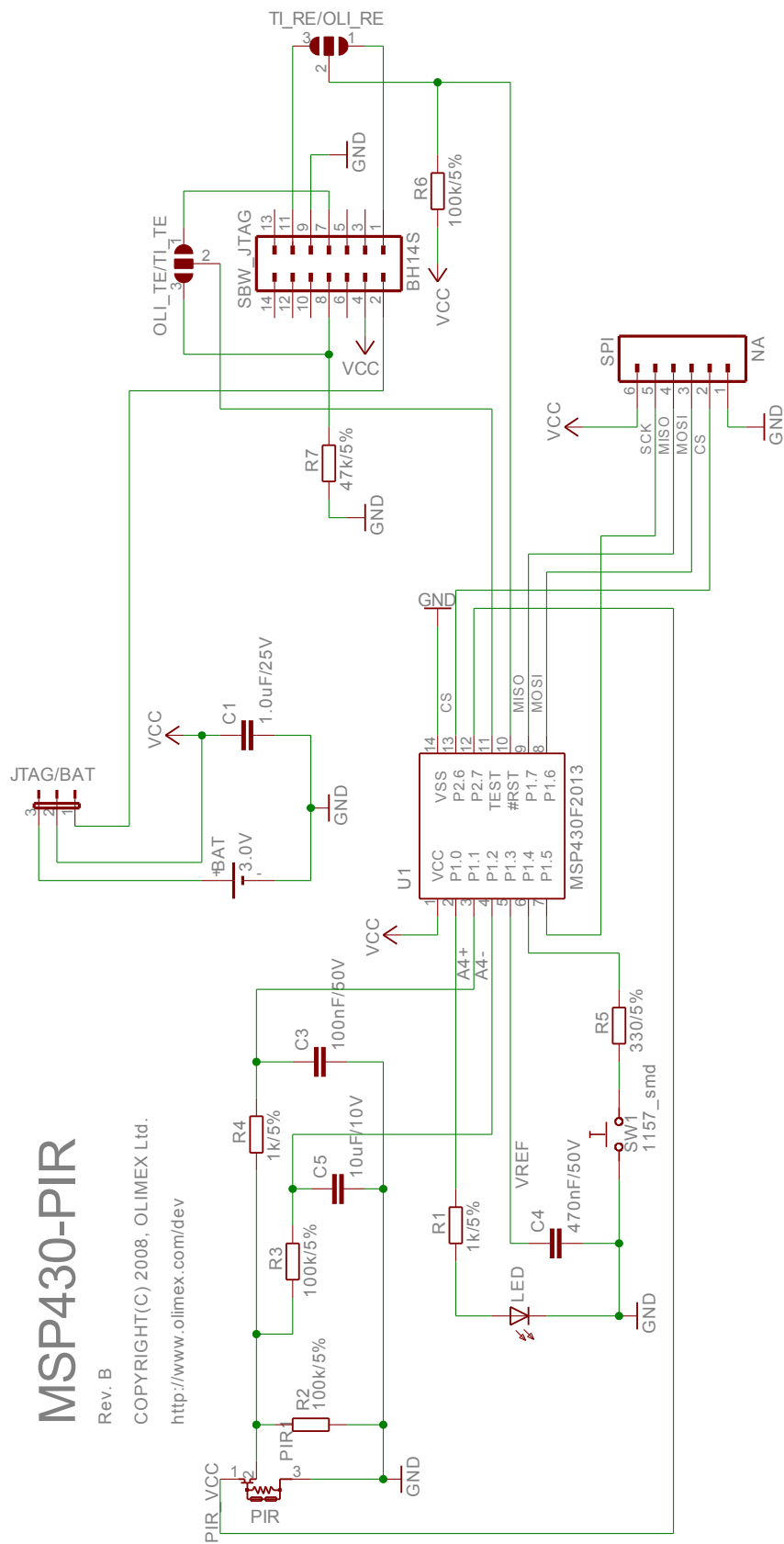
- Low Supply Voltage Range 1.8 V to 3.6 V
- Ultralow-Power Consumption
 - Active Mode: 220 μ A at 1 MHz, 2.2 V
 - Standby Mode: 0.5 μ A
 - Off Mode (RAM Retention): 0.1 μ A
- Five Power-Saving Modes
- Ultrafast Wake-Up From Standby Mode in Less Than 1 μ s

- 16-Bit RISC Architecture, 62.5 ns Instruction Cycle Time
- Basic Clock Module Configurations:
 - Internal Frequencies up to 16 MHz With Four Calibrated Frequencies to $\pm 1\%$
 - Internal Very Low Power LF Oscillator
 - 32-kHz Crystal
 - External Digital Clock Source
- 16-Bit Timer_A With Two Capture/Compare Registers
- 16-Bit Sigma-Delta A/D Converter With Differential PGA Inputs and Internal Reference
- Universal Serial Interface (USI) Supporting SPI and I2C
- Brownout Detector
- Serial Onboard Programming, No External Programming Voltage Needed
Programmable Code Protection by Security Fuse
- On-Chip Emulation Logic With Spy-Bi-Wire Interface
- 2KB + 256B Flash Memory
- 128B RAM

BLOCK DIAGRAM:



SCHEMATIC:



MSP430-PIR

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POWER SUPPLY CIRCUIT:

MSP430-PIR can take power from two sources:

- + 3V Lithium battery
- JTAG connector

Power consumption in standby mode is 10 μ A. In working mode the maximum power consumption is 1.3mA.

RESET CIRCUIT:

MSP430-PIR reset circuit includes jumper TI_RE/OLI_RE, pull-up resistor R16 (100k) and MSP430F2013 pin 10 (#RST - signal SBWDAT).

JUMPER DESCRIPTION:

TI_RE/OLI_RE



This jumper, when is in position TI_RE, connects SBW_JTAG pin 1 to MSP430F2013 pin 10 (#RST - signal SBWDAT). When this jumper is in position OLI_RE, connects SBW_JTAG pin 11 to MSP430F2013 pin 10 (#RST - signal SBWDAT).

Default state is in position OLI_RE for programming with OLIMEX MSP430-JTAG.

OLI_TE/TI_TE



This jumper, when is in position OLI_TE, connects SBW_JTAG pin 8 to MSP430F2013 pin 11 (TEST). When this jumper is in position TI_TE, connects SBW_JTAG pin 7 to MSP430F2013 pin 11 (TEST).

Default state is in position OLI_TE for programming with OLIMEX MSP430-JTAG.

Olimex Jumpers TI_RE/OLI_RE and OLI_TE/TI_TE are for selecting programmers - JTAGS, or Texas Instruments - JTAGS.

JTAG/BAT



This jumper, when is in position JTAG - the board power supply is from the JTAG and when is in position BAT - the board power supply is from + 3 V Battery.

Default state is in position JTAG.

INPUT/OUTPUT:

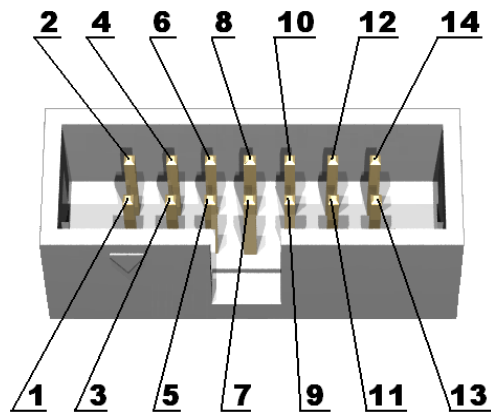
LED (red) connected to MSP430F2013 pin 2 (P1.0).

User button with name **SW1** connected via R5 (330 Ω) to **MSP430F2013** pin 6 (P1.4) - enables and disables blinking LED.

EXTERNAL CONNECTORS DESCRIPTION:

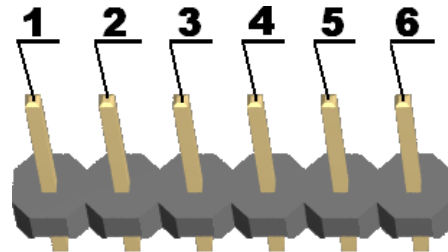
SBW JTAG:

| Pin # | Signal Name |
|-------|--------------------|
| 1 | To TI_RE/OLI_RE |
| 2 | To JTAG/BAT |
| 3 | Not connected |
| 4 | VCC |
| 5 | Not connected |
| 6 | Not connected |
| 7 | To OLI_TE/TI_TE |
| 8 | To OLI_TE/TI_TE |
| 9 | GND |
| 10 | Not connected |
| 11 | To TI_RE/OLI_RE |
| 12 | Not connected |
| 13 | Not connected |
| 14 | Not connected |

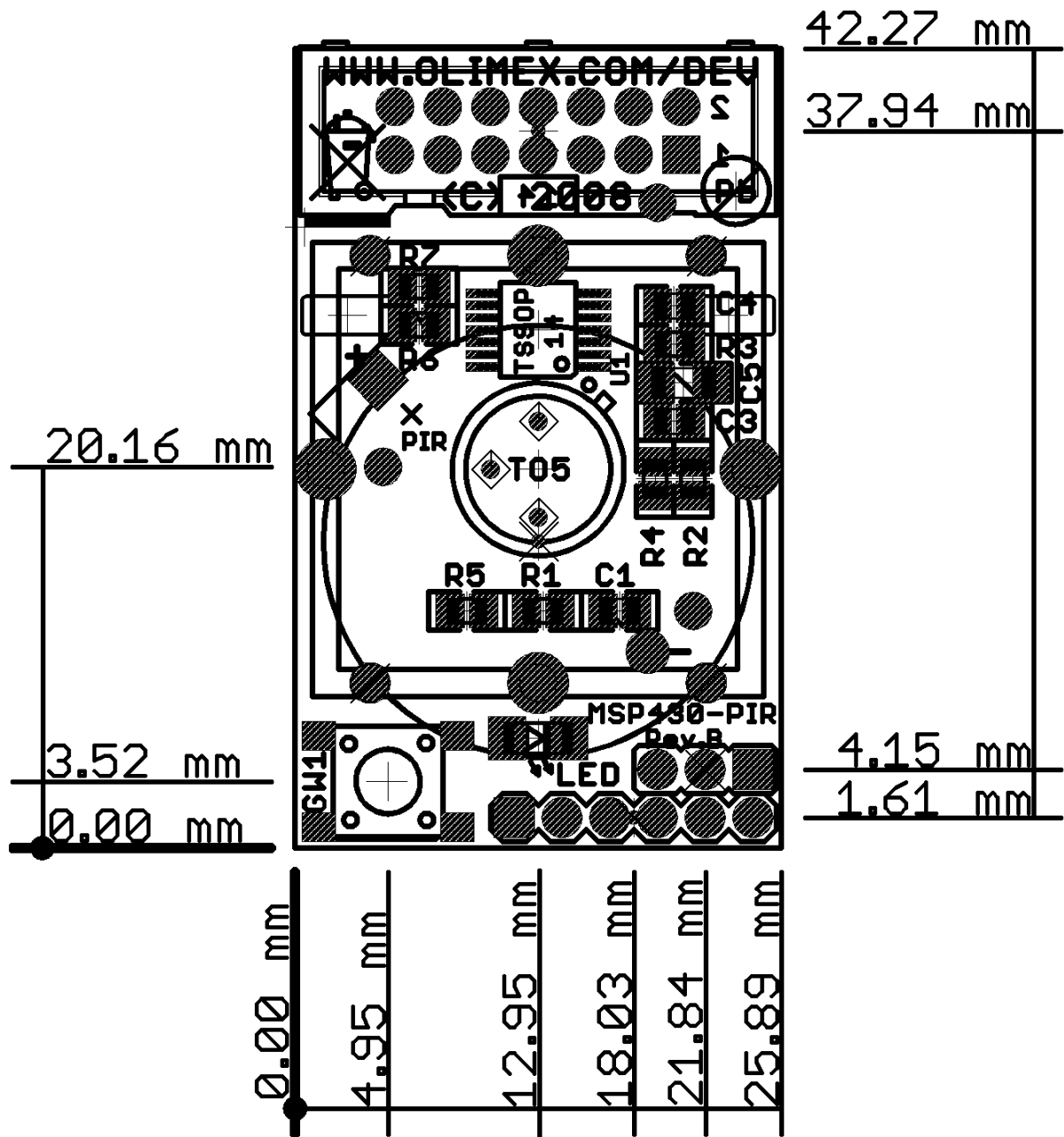


SPI:

| Pin # | Signal Name |
|-------|-------------|
| 1 | GND |
| 2 | CS |
| 3 | MOSI |
| 4 | MISO |
| 5 | SCK |
| 6 | VCC |



MECHANICAL DIMENSIONS:



AVAILABLE DEMO SOFTWARE:

For demo software visit <http://www.olimex.com/dev>

ORDER CODE:

MSP430-PIR - assembled and tested board

How to order?

You can order to us directly or by any of our distributors.
Check our web www.olimex.com/dev for more info.

Revision history:

| | |
|--------------------|---------------|
| Board's Revision: | B, June 2008 |
| Manual's Revision: | C, April 2011 |

- added power consumption